FIU Facilities

InstructionalandResearchComputingCenter(IRCC)

The Division of IT at Florida International University established the Instructional & Research Computing Center (IRCC) in 2012 to consolidate and expand computational computing resources within a centrally managed facility.The primary goal of the center is to provide the technologies, training, and support needed by faculty to help them succeed in their research and academic endeavors.There are 3.5 full-time employees (FTEs) dedicated to the management of IRCC resources, with additional support provided by the Division of IT's Operations team (Datacenter team), Network Management Services, and Enterprise Systems team.

For further information on FIU's Instructional and Research Computing Center, please see:

http://ircc.fiu.edu

Equipment:

IRCC's Roary clusters are Linux environment based on AlmaLinux platform consisting of approximately 4200 CPU cores, approximately 19 GPU-enabled compute nodes, high-memory compute resources, and visualization systems supporting research and instructional workloads across multiple scientific and engineering disciplines.

The current environment consists of Dell PowerEdge and HPE compute platforms including standard 40-core, 44-core, and 64-core, 128-core, 144-core compute nodes, AMD EPYC Zen2, Intel Sapphire Rapids high-memory nodes, NVIDIA Titan V GPU resources, NVIDIA Titan X GPU resources, NVIDIA Tesla V100 GPU systems and dedicated visualization and data transfer systems. The infrastructure also includes high-memory compute nodes with configurations up to 70 TB RAM designed for memory intensive research applications, AI/ML workloads, scientific computing, and large-scale computational workflows.

The cluster environment utilizes a low-latency Ethernet interconnect, and the cluster is connected to a 200 Gbps InfiniBand fabric together with centralized Lustre-based shared home, project, and scratch storage systems providing over 1.2 PB of high-performance parallel storage supporting large-scale research data workflows.

Datacenter:

The IRCC has two datacenters at its disposal. FIU's primary datacenter has 2000 SF of raised floor space, located on FIU's Modesto Maidique Campus. It is managed and monitored 24/7 by the Division of IT's Operations department. Its power infrastructure includes enterprise grade power distribution systems, which are fed with conditioned power from a redundant Uninterruptible Power Supply (UPS) infrastructure that will provide a smooth transition to an on-site generator in the case of commercial power outages. The heating, ventilation and air conditioning (HVAC) system is redundant to ensure continuous operation should one module be out of operation as a result of equipment failure or scheduled maintenance. An advanced clean agent fire-suppression system is in place as a protective measure. To ensure security, the datacenter has a variety of access controls, including, but not limited to, two-factor entry systems, 24/7 monitored alarm and video surveillance systems.

The Division of IT, including the IRCC, has a presence in Verizon's NAP of the Americas [3]. This is a 750,000 square foot Tier IV datacenter. It is the "first purpose-built, carrier-neutral Network Access Point and is the only facility of its kind specifically designed to link Latin America with the rest of the world.

Network Infrastructure

The FIU Datacenter, including IRCC resources are connected to the campus 10 gigabit backbone. This backbone connects FIU and its computational computing resources to the Florida Lambda Rail, which connectivity to the National Lambda Rail and Internet2 can then be achieved. Furthermore, FIU has strands of dark fiber to Verizon's NAP of the Americas connecting it to Division of IT resources at that location, including AMPATH International Exchange Point (IXP) [4], a project of FIU.

"AMPATH serves as the premiere interconnection point for network-enabled U.S. - Latin America and Caribbean science research and education. Through its exchange point facilities in Miami, Florida, high bandwidth network services are available for U.S. and international research and education networks to extend participation to underrepresented groups in Latin America and the Caribbean. AMPATH works as a major research facility recognized by the U.S. National Science Foundation, supporting international e-science."

For further information about AMPATH, please see https://www.ampath.net

The Science DMZ has been implemented at FIU as part of FIU's advanced research network infrastructure. IRCC's resources are connected to this Science DMZ to provide enhanced end-to-end connectivity to research instruments and advanced research systems, including resources supporting large-scale scientific computing, data-intensive research workflows, and high-performance research applications.

Staffing

Two full-time staff are dedicated to design and manage the IRCC resources. Additionally, five full-time staff members are shared between the Instructional and Research Computing Center and Enterprise Systems - both of which are departments within FIU's Division of IT. These positions also provide training documentation and workshops for FIU faculty and students to help take full advantage of the center's resources. Other Division of IT departments, such as Operations and Network Management Services support IRCC efforts by providing professional enterprise level datacenter hosting and network infrastructure services 24 hour a day, 365 days a year.

Florida Cyber-infrastructure

Florida International University is a member of the Sunshine State Education & Research Computing Alliance (SSERCA), which "brings together geographically distributed organizations and resources in such a way that their collective impact is far greater than the sum of their individual parts. The mission of SSERCA is to further the development of a state-wide computational science infrastructure of advanced scientific computing, communication and education resources by promoting cooperation between Florida's universities." Currently SSERCA consists of six members (FIU, FSU, UCF, UM, USF, UFL) and five affiliate members (FAMU, ERAU, FIT, UNF & FAU).

References

1. Instructional and Research Computing Center (IRCC), http://ircc.fiu.edu
2. Virtual Computing Lab (VCL), http://ircc.fiu.edu/resources/vcl/
3. Verizon's NAP of the Americas, http://www.terremark.com/data-centers/americas/nap-americas.aspx
4. AMPATH, The International Exchange Point for Research, http://www.ampath.fiu.edu/index.php
5. ExoGeni, http://www.exogeni.net
6. Sunshine State Educational & Research Computing Alliance, http://www.SSERCA.org